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EXAMINER

MARCHESCHI, MICHAEL A

ART UNIT	PAPER NUMBER
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1793

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/730,527	Applicant(s) SIDDIQUI, JUNAID AHMED	
	Examiner Michael A. Marcheschi	Art Unit 1793	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 July 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 19-31 and 34-47 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 19-31 and 34-47 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All   b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other:  |

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The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 21, 34, 35, 37, 43, 44, 45 and 47 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for removal rate of 3707 and 3983 (literal values) defined in the table does not reasonably provide enablement for a removal rate of at least 3983, as claimed. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with this claim.

Claims 21, 34, 35, 37, 43, 44, 45 and 47 claim a removal rate of at least 3983. Since the claims defines no upper limit for the removal rate and the specification removal rates are defined as 3707 and 3983, the specification does not enable the breadth of the instant claim. In other words, since the claims define no upper limit, the examiner is hard pressed to assume that *any and all* values above 3983 are within the scope of the claimed invention, as defined by the specification. If applicants disagree, they are requested to submit clear proof that any and all values above 3983 (i.e. 8,000+, etc.) are enabled by the disclosure.

Claim 36 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for 134 defects per wafer at the defined resolution (literal value) defined in the table does not reasonably provide enablement for 134 *or less*, as claimed. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with this claim.

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Claim 36 claims a defect count of 134 or less. Since the claim define no lower limit for the defect count and the specification defect count is defined 134, the specification does not enable the breadth of the instant claim. In other words, since the claim defines no lower limit the examiner is hard pressed to assume that any and all values below 134 (i.e. zero) are within the scope of the claimed invention, as defined by the specification. If applicants disagree, they are requested to submit clear proof that any and all values below 134 (i.e. zero) are enabled by the disclosure.

Claims 38, 46 and 47 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for 1632 defects per wafer at the defined resolution (literal value) defined in the table does not reasonably provide enablement for 1632 *or less*, as claimed. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with this claim.

Claims 38, 46 and 47 claim a defect count of 1632 or less. Since the claims define no lower limit for the defect count and the specification defect count is defined 1632, the specification does not enable the breadth of the instant claim. In other words, since the claim defines no lower limit the examiner is hard pressed to assume that any and all values below 1632 (i.e. zero) are within the scope of the claimed invention, as defined by the specification. If applicants disagree, they are requested to submit clear proof that any and all values below 1632 (i.e. zero) are enabled by the disclosure.

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New claim 40 (previously claim 32) is rejected under 35 U.S.C. 103(a) as obvious over Streinz et al. (686) in view of Moeggenborg et al. (762).

Streinz et al. teach in the abstract, column 4, line 25-column 7, line 60, a polishing composition which comprises an abrasive (silica), a fluoride salt (ammonium fluoride) and a surfactant. The composition is used to polish substrates that contain dielectrics by contacting the surface of the substrate with a polishing pad.

Moeggenborg et al. teaches in column 6, last three lines of section [0047], that the claimed specific diol is a known (nonionic) surfactant to be used with colloidal abrasive (silica) to make a polishing composition.

The primary reference teaches a composition that contains the claimed components a) and b). With respect to claimed component "c)", the primary reference teaches that a surfactant can be added (surfactant is not limited and can be a nonionic surfactant). The claimed diol is a well known nonionic surfactant (to be used with colloidal abrasive to make a polishing composition), as is clearly shown by the secondary reference and therefore the use thereof is well within the level of ordinary skill in the art because the primary reference implies that any nonionic surfactant can be used. This implication, as defined by the primary reference, provides the necessary motivation for the combination, as applied. The use of any nonionic surfactant is obvious to the skilled artisan, especially known nonionic surfactants, as shown by the secondary reference. The examiner acknowledges that the teaching of the secondary reference is a comparative example, however, since a reference can be used for all it teaches, this surfactant is known, irrespective of it being defined in a comparative example.

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New claim 46 is rejected under 35 U.S.C. 103(a) as obvious over Streinz et al. (686) in view of Moeggenborg et al. (762) in view of Feeney et al. (105).

Although the combination above does not literally define the washing with HF and resulting defect count, no distinction is seen to exist because (1) the claim does not define that this is a positive method step of the polishing method (i.e. the claim does not state that after polishing, the wafer is washed with HF), (2) the use of a washing step defines a post polishing method and cannot be considered to be a polishing method, per se and (3) even if it is a positive polishing method step, the examiner takes official notice that washing a wafer with a 1% HF solution is conventional in the art ( see Feeney at column 4, lines 41-43), thus the use of a washing step to remove residuals from the wafer is well within the scope of the skilled artisan and therefore obvious. With this being obvious, it is the examiners position that the results obtained can be the claimed wafer defect count and burden is upon applicant to show otherwise.

Claims 19-21, 25-30 and new claim 40 (previously claim 32) are rejected under 35 U.S.C. 103(a) as obvious over Mirsa et al. in view of Moeggenborg et al. (762).

Misra et al. teach in column 3, lines 30-57 and column 5, line 25-column 6, line 35, a polishing composition which comprises 2-50% of an abrasive (colloidal silica), about 0.1% of ammonium fluoride and a surfactant. An example of a surfactant is of the SURFYNOL type (i.e. nonionic surfactant). The composition is used to polish substrates that contain silicon oxide/silicon nitride by contacting the surface of the substrate with a polishing pad.

The primary reference teaches a composition that contains the claimed components a) and b). With respect to claimed component "c)", the primary reference teaches that a surfactant

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can be added (an example of a surfactant is defined and this being a **nonionic** surfactant-SURFYNOL type). The claimed diol is a well known nonionic surfactant (to be used with colloidal abrasive to make a polishing composition), as is clearly shown by the secondary reference and therefore the use thereof is well within the level of ordinary skill in the art because the primary reference implies that any type of SURFYNOL (nonionic surfactants) can be used (i.e. the reference is not limited to the specific nonionic surfactant defined because this is a mere example). This implication, as defined by the primary reference, provides the necessary motivation for the combination, as applied. The use of any nonionic surfactant is obvious to the skilled artisan, especially known SURFYNOL (nonionic) surfactants, as shown by the secondary references. In addition, and assuming *arguendo* about the surfactant defined by the primary reference, the substitution of one known SURFYNOL (nonionic) surfactant for another is well within the level of ordinary skill in the art. In view of this, the use of any nonionic SURFYNOL surfactant is well within the level of ordinary skill in the art. The examiner acknowledges that the teaching of the secondary reference is a comparative example, however, since a reference can be used for all it teaches, this surfactant is known, irrespective of it being defined in a comparative example. With respect to the amount of surfactant, one skilled in the art would have appreciated the amount need to optimize the slurry in terms of the wettability, said amounts being conventional in the art, as shown by the secondary reference. Although the amount of fluoride defined by the primary reference is not literally the value of claim 22, this is still obvious because both the primary reference and the claim defines the amount in terms of “about” and about permits some tolerance. *In re Ayers*, 154 F 2d 182, 69 USPQ 109. With respect to the removal rate, since the composition is the same and is used to polish the same

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material (dielectric), it can be expected that the composition will provide the same removal rate of the dielectric because the same composition is expected to yield the same results. With respect to claim 26, the primary reference polishes silicon dioxide and it is known that silicon dioxide is formed from PETEOS, as shown by the secondary reference in example 2, thus this limitation would have been appreciated by the skilled artisan.

New claims 34-39 and 43-47 are rejected under 35 U.S.C. 103(a) as obvious over Mirsa et al. in view of Moeggenborg et al. (762) alone or further in view of Feeney et al. (105).

With respect to the rate of claims 34, 37, 43, 45 and 47, since the composition of the combined references (Mirsa et al. in view of Moeggenborg et al.) is the same and is used to polish the same material (dielectric), it can be expected that the composition will provide the same removal rate of the dielectric because the same composition is expected to yield the same results absent clear evidence to the contrary. In addition, claim 34 and 43 does not define a positive method step (i.e. "when used to polish" is not a positive method step).

With respect to claim 35, 36, 44, although the combination above does not literally define the washing with HF and resulting defect count, no distinction is seen to exist because (1) the claims do not define that this is a positive method step of the polishing method (i.e. the claims state "when supplied" and this is not a positive method step) and (2) even if it is a positive polishing method step, these parameters are considered result effective variables, therefore one skilled in the art would be expected to be able to optimize these parameters to arrive at the desired polishing rate. See MPEP 2144.05[R-5]-Optimization Within Prior Art Conditions or Through Routine Experimentation. With this being obvious, it is the examiners position that the



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results obtained can be the claimed wafer defect count and burden is upon applicant to show otherwise.

With respect to claim 38, 46, 47, although the combination above does not literally define the washing with HF and resulting defect count, no distinction is seen to exist because (1) the claims do not define that this is a positive method step of the polishing method (i.e. the claims do not state that after polishing, the wafer is washed with HF), (2) the use of a washing step defines a post polishing method and cannot be considered to be a polishing method, per se and (3) even if it is a positive polishing method step, the examiner takes official notice that washing a wafer with a 1% HF solution is conventional in the art (see Feeney at column 4, lines 41-43), thus the use of a washing step to remove residuals from the wafer is well within the scope of the skilled artisan and therefore obvious. With this being obvious, it is the examiners position that the results obtained can be the claimed wafer defect count and burden is upon applicant to show otherwise.

With respect to claim 39, Misra clearly discloses this.

Claims 19-23, 26-30 and 40 (previously claim 32) are rejected under 35 U.S.C. 103(a) as obvious over Pasqualoni et al. (913) in view of Moeggenborg et al. (762).

Pasqualoni et al. teach in column 4, line 29, column 4, line 65-column 5, line 1 and column 5, line 39, a polishing composition which comprises 0.5-40% of an abrasive (colloidal silica), about 0.01% of a fluoride salt and the claimed amount of surfactant. The composition is used to polish substrates that contain silicon oxide/silicon nitride by contacting the surface of the substrate with a polishing pad. The composition is used to polish substrates that contain

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dielectrics (silicon dioxide as implied by the teaching of column 1, lines 4-5 and column 1, lines 17-19) by contacting the surface of the substrate with a polishing pad.

The primary reference teaches a composition that contains the claimed components a) and b). With respect to claimed component "c)", the primary reference teaches that a surfactant can be added (surfactant is not limited and can be a **nonionic** surfactant). The claimed diol is a well known nonionic surfactant (to be used with colloidal abrasive to make a polishing composition), as is clearly shown by the secondary reference and therefore the use thereof is well within the level of ordinary skill in the art because the primary reference implies that any nonionic surfactant can be used. This implication, as defined by the primary reference, provides the necessary motivation for the combination, as applied. The use of any nonionic surfactant is obvious to the skilled artisan, especially known nonionic surfactants, as shown by the secondary reference. The examiner acknowledges that the teaching of the secondary reference is a comparative example, however, since a reference can be used for all it teaches, this surfactant is known, irrespective of it being defined in a comparative example. Although the amount of fluoride defined by the primary reference is not literally the value of claim 22, this is still obvious because both the primary reference and the claim defines the amount in terms of "about" and about permits some tolerance. *In re Ayers*, 154 F 2d 182, 69 USPQ 109. With respect to the removal rate, since the composition is the same and is used to polish the same material (dielectric), it can be expected that the composition will provide the same removal rate of the dielectric because the same composition is expected to yield the same results. With respect to claim 26, the primary reference polishes silicon dioxide and it is known that silicon dioxide is

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formed from PETEOS, as shown by the secondary reference in example 2, thus this limitation would have been appreciated by the skilled artisan.

The examiner acknowledges that all the primary references, above, disclose additional components, however, the transitional phrase "consisting essentially of" only limits the scope of a claim to the specified materials or steps "and those that do not materially affect the basic and novel characteristic(s)" of the claimed invention. In re Herz, 537 F.2d 549, 551-52, 190 USPQ 461, 463 (CCPA 1976). It is therefore the examiners position that the reference teachings are still within the scope of "consisting essentially of" because it is the examiners position that said additional components would not materially affect the basic and novel characteristic(s)" of the claimed invention. Applicant has the burden of showing that the introduction of additional components would materially change the characteristics of applicant's invention.

New claims 34-39 and 43-47 are rejected under 35 U.S.C. 103(a) as obvious over Pasqualoni et al. (913) in view of Moeggenborg et al. (762) alone or further in view of Feeney et al. (105).

With respect to the rate of claims 34, 37, 43, 45 and 47, since the composition of the combined references (Pasqualoni et al. in view of Moeggenborg et al.) is the same and is used to polish the same material (dielectric), it can be expected that the composition will provide the same removal rate of the dielectric because the same composition is expected to yield the same results absent clear evidence to the contrary. In addition, claim 34 and 43 does not define a positive method step (i.e. "when used to polish" is not a positive method step).

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With respect to claim 35, 36, 44, although the combination above does not literally define the washing with HF and resulting defect count, no distinction is seen to exist because (1) the claims do not define that this is a positive method step of the polishing method (i.e. the claims state "when supplied" and this is not a positive method step) and (2) even if it is a positive polishing method step, these parameters are considered result effective variables, therefore one skilled in the art would be expected to be able to optimize these parameters to arrive at the desired polishing rate. See MPEP 2144.05[R-5]-Optimization Within Prior Art Conditions or Through Routine Experimentation. With this being obvious, it is the examiners position that the results obtained can be the claimed wafer defect count and burden is upon applicant to show otherwise.

With respect to claim 38, 46, 47, although the combination above does not literally define the washing with HF and resulting defect count, no distinction is seen to exist because (1) the claims do not define that this is a positive method step of the polishing method (i.e. the claims do not state that after polishing, the wafer is washed with HF), (2) the use of a washing step defines a post polishing method and cannot be considered to be a polishing method, per se and (3) even if it is a positive polishing method step, the examiner takes official notice that washing a wafer with a 1% HF solution is conventional in the art (see Feeney at column 4, lines 41-43), thus the use of a washing step to remove residuals from the wafer is well within the scope of the skilled artisan and therefore obvious. With this being obvious, it is the examiners position that the results obtained can be the claimed wafer defect count and burden is upon applicant to show otherwise.

With respect to claim 39, Pasqualoni et al. clearly discloses this.

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Claims 19-24 and 26-31, 34 and 40 (previously claim 32) are rejected under 35 U.S.C. 103(a) as obvious over Fang et al. (817) in view of Moeggenborg et al. (762).

Fang et al. teach in column 2, line 35-column 3, line 98, and column 4, line 31-column 6, line 56, a polishing composition which comprises 0.1-40% total solids of an abrasive (with 95% being colloidal silica), a fluoride salt, as is evident from column 4, line 65 coupled with column 5, line 48 (any amount can be used but desirably present at a minimum amount of about 0.01%) and a surfactant. The composition is used to polish substrates that contain dielectrics (silicon dioxide-removing silicon dioxide at a high rate). No oxidizer needs to be present.

The primary reference teaches a composition that contains the claimed components a) and b). With respect to claimed component "c)", the primary reference teaches that a surfactant can be added (surfactant is not limited and can be a nonionic surfactant). The claimed diol is a well known nonionic surfactant (to be used with colloidal abrasive to make a polishing composition), as is clearly shown by the secondary reference and therefore the use thereof is well within the level of ordinary skill in the art because the primary reference implies that any nonionic surfactant can be used. This implication, as defined by the primary reference, provides the necessary motivation for the combination, as applied. The use of any nonionic surfactant is obvious to the skilled artisan, especially known nonionic surfactants, as shown by the secondary reference. With respect to the amount of surfactant, one skilled in the art would have appreciated the amount need to optimize the slurry in terms of the wettability, said amounts being conventional in the art, as shown by the secondary reference. With respect to the amount of fluoride salt, Fang et al. teaches that this component is used in any amount but desirably

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present at a minimum amount of about 0.01%. The literal amount defined by this reference reads on the amount defined by instant claim 20. Although the amount of fluoride defined by the primary reference is not literally the value of claim 22, this is still obvious because both the primary reference and the claim defines the amount in terms of “about” and about permits some tolerance. *In re Ayers*, 154 F 2d 182, 69 USPQ 109. In the alternative, Fang et al. teaches that any amount can be added and the desirable limitation (0.01%) can be viewed as a preferred amount. Since a reference is not limited to the preferred embodiments, it can be reasonably concluded that the statement “any amount” encompasses values less than the desired amount stated by the reference, thus broadly encompasses the claimed amount. With respect to the removal rate, since the composition is the same and is used to polish the same material (dielectric), it can be expected that the composition will provide the same removal rate of the dielectric because the same composition is expected to yield the same results. With respect to claim 26, the primary reference polishes silicon dioxide and it is known that silicon dioxide is formed from PETEOS, as shown by the secondary reference in example 2, thus this limitation would have been appreciated by the skilled artisan. With respect to claim 24, the primary reference teaches in column 6, lines 61-62 that low dielectric films can be polished and this broadly encompasses the claimed limitation.

New claims 34-47 are rejected under 35 U.S.C. 103(a) as obvious over Fang et al. (817) in view of Moeggenborg et al. (762) alone or further in view of Feeney et al. (105).

With respect to the rate of claims 34, 37, 43, 45 and 47, since the composition of the combined references (Fang et al. in view of Moeggenborg et al.) is the same and is used to polish

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the same material (dielectric), it can be expected that the composition will provide the same removal rate of the dielectric because the same composition is expected to yield the same results absent clear evidence to the contrary. In addition, claim 34 and 43 does not define a positive method step (i.e. "when used to polish" is not a positive method step).

With respect to claim 35, 36, 44, although the combination above does not literally define the washing with HF and resulting defect count, no distinction is seen to exist because (1) the claims do not define that this is a positive method step of the polishing method (i.e. the claims state "when supplied" and this is not a positive method step) and (2) even if it is a positive polishing method step, these parameters are considered result effective variables, therefore one skilled in the art would be expected to be able to optimize these parameters to arrive at the desired polishing rate. See MPEP 2144.05[R-5]-Optimization Within Prior Art Conditions or Through Routine Experimentation. With this being obvious, it is the examiners position that the results obtained can be the claimed wafer defect count and burden is upon applicant to show otherwise.

With respect to claim 38, 46, 47, although the combination above does not literally define the washing with HF and resulting defect count, no distinction is seen to exist because (1) the claims do not define that this is a positive method step of the polishing method (i.e. the claims do not state that after polishing, the wafer is washed with HF), (2) the use of a washing step defines a post polishing method and cannot be considered to be a polishing method, per se and (3) even if it is a positive polishing method step, the examiner takes official notice that washing a wafer with a 1% HF solution is conventional in the art ( see Feeney at column 4, lines 41-43), thus the use of a washing step to remove residuals from the wafer is well within the scope of the skilled

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artisan and therefore obvious. With this being obvious, it is the examiners position that the results obtained can be the claimed wafer defect count and burden is upon applicant to show otherwise.

With respect to claims 39, 41 and 42, Fang et al. clearly discloses these limitations.

Applicant's arguments filed 7/30/07 have been fully considered but they are not persuasive.

**Arguments based on the 112 rejections.**

Applicant argues that the scope of "high" is not indefinite. After further review, the examiner has withdrawn this rejection (112 second paragraph), however, the 112 first paragraph rejection based on the rate is still being applied because applicant provides no proof that the specification enables any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with this claim. For instance, since the claims define no upper limit, the examiner is hard pressed to assume that *any and all* values above 3983 are within the scope of the claimed invention, as defined by the specification. Applicant has not shown any clear evidence that would support that any and all values above 3983 (i.e. 8,000+, etc.) are enabled by the disclosure.

**Arguments based on Streinz/Moeggenborg.**

With respect to the rejection of claim 32 (now claim 40) based on Streinz/Moeggenborg, applicant argues that Streinz does not teach the claimed invention because claim 40 defines the



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composition in terms of “consisting essentially of” and the oxidizer of Streinz materially effects the basic and novel characteristics of the composition. To support this, applicant refers to the difference in polishing rates between the Strienz composition and the invention. This is not persuasive because (1) claim 40 does not define any properties and (2) applicant has not clearly shown the use of an oxidizer will materially change the characteristics of applicant’s invention (no characteristics are claimed in claim 40). Applicant has the burden of showing that the introduction of additional would materially change the characteristics of applicant’s invention and no clear evidence (comparative testing) has been defined.

**Arguments based on Misra/Moeggenborg.**

With respect to the rejection of claim 19, applicant argues that Misra and Moeggenborg will not provide an oxide composition capable of polishing at high rates. This conclusion is based on (1) no teaching or suggestion of high removal rates in Misra and (2) the examples of Moeggenborg teach medium removal rates. First, a reference is not limited to the disclosure in the examples but rather can be used for all it realistically teaches and second, the examiner is aware that Misra might not teach literally teach removal rates for the broad composition, however, this does not preclude the combination, as defined above, from have the claimed removal rates for the reasons defined below and applicant has not shown evidence otherwise. The examiner has clearly made a prima facie case of obvious for the combination of components and stated that since the composition is the same (composition defined by the above combination) and is used to polish the same material (dielectric), the claimed removal rate is expected because the same composition is expected to yield the same results. In view of this,

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burden is upon applicant to show that this combination would not result in the claimed removal rate and/or unexpected results for the claimed composition commensurate in scope with said composition. Applicant has not clearly shown any evidence that would establish criticality. In addition, it would appear that applicant is arguing the references alone and not in the combination, as applied and one cannot show nonobviousness by attacking references individually where the rejections are based on a combination of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

With respect to the rejection of claims 21 and 34, applicant argues that Misra and Moeggenborg will not provide an oxide composition capable of polishing at high rates. This conclusion is based on (1) no teaching or suggestion of high removal rates in Misra and (2) the examples of Moeggenborg teach medium removal rates. In response to these arguments, the examiner incorporates by reference the remarks defined above.

With respect to the rejection of claim 22, applicants remarks are convincing and the examiner has withdrawn this claim from the above rejection.

With respect to the rejection of claim 32 (now claim 40), applicant argues that since Mirsa uses additional components (oxidizer, ammonium hydroxide), it is outside the scope of the instant claims (consisting essentially of). The examiner disagrees because applicant has not clearly shown that the use of an oxidizer will materially change the characteristics of applicant's invention (no characteristics are claimed in claim 40). Applicant has the burden of showing that the introduction of additional would materially change the characteristics of applicant's invention and no clear evidence (comparative testing) has been defined.

**Arguments based on Pasqualoni/Moeggenborg.**

With respect to the rejection of claim 19, applicant argues that Pasqualoni and Moeggenborg will not provide an oxide composition capable of polishing at high rates. This conclusion is based on (1) no teaching or suggestion of high removal rates in Pasqualoni and (2) the examples of Moeggenborg teach medium removal rates. First, a reference is not limited to the disclosure in the examples but rather can be used for all it realistically teaches and second, the examiner is aware that Pasqualoni might not literally teach removal rates for the broad composition, however, this does not preclude the combination, as defined above, from have the claimed removal rates for the reasons defined below and applicant has not shown evidence otherwise. The examiner has clearly made a prima facie case of obvious for the combination of components and stated that since the composition is the same (composition defined by the above combination) and is used to polish the same material (dielectric), the claimed removal rate is expected because the same composition is expected to yield the same results. In view of this, burden is upon applicant to show that this combination would not result in the claimed removal rate and/or unexpected results for the claimed composition commensurate in scope with said composition. Applicant has not clearly shown any evidence that would establish criticality. In addition, applicant refers to figure 1 of Pasqualoni and states that "TOX" might be silicon oxide. Applicant provides no proof of this. Figure 1 of this reference refers to the removal rates of a metal and not a metal oxide, thus applicants arguments about this figure are not convincing. Finally, it would appear that applicant is arguing the references alone and not in the combination, as applied and one cannot show nonobviousness by attacking references individually where the

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rejections are based on a combination of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

On page 14, first full paragraph of the response, applicant argues the examiner reasoning about the removal rate of silicon oxide. The examiner has not defined that the composition of Pasqualoni is the same as the claimed composition. If this was the case, Moeggenborg would not have been applied in combination with Pasqualoni. To the contrary, the examiner has clearly made a prima facie case of obvious for the combination of components and stated that since the composition (of the combined references) is the same and is used to polish the same material (dielectric), the claimed removal rate is expected because the same composition is expected to yield the same results. Applicant also argues the examples of Pasqualoni, however a reference is not limited to only the teaching in the examples. Applicant has not shown clear evidence (1) specifically rebutting the examiner combination and/or (2) evidence that the resulting combination, as applied by the examiner, is not capable of polishing at the claimed high rate. Finally, applicant appears to argue that the composition of Pasqualoni is identical to the composition of Streinz and thus the removal rate of Pasqualoni will be consistent with those of Streinz. The examiner disagrees because the compositions are not identical (Pasqualoni uses higher amounts of fluoride). With a higher amounts of fluoride, it is the examiners position that the silicon oxide polishing rate will be increased (to support examiners position evidence is directed to column 8, lines 60-63 of Streinz which implies that high amounts of fluoride ions increase the polishing rate of silicon dioxide). Applicant also argue the amount of fluoride salt, however, claim 19 does not define any amount.

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With respect to claims 21 and 34, applicant argues that Pasqualoni does not teach polishing silicon dioxide (only the background refers to this). This is not persuasive because column 5, line 35 clearly teaches that silicon oxide is polished. With respect to the TEOS, applicant states that the “examiner implied that an oxide formed from TEOS has the same properties as silicon dioxide. Applicant is misconstruing the examiner words, the examiner never said this, all that was mentioned about the TEOS is that “ with respect to claim 26, the primary reference polishes silicon dioxide and it is known that silicon dioxide is formed from PETEOS, as shown by the secondary reference in example 2, thus this limitation would have been appreciated by the skilled artisan”. With respect to the balance of the arguments, applicant argues that Pasqualoni and Moeggenborg will not provide an oxide composition capable of polishing at high rates. This conclusion is based on (1) no teaching or suggestion of high removal rates in Pasqualoni and (2) the examples of Moeggenborg teach medium removal rates. In response to these arguments, the examiner incorporates by reference the remarks defined above with respect to the removal rates.

With respect to claim 22, applicant argues that “about” 0.01% does not read on the claimed amount. This is not persuasive because it is the examiner's position “about” can mean a variation of 20% with respect to the defined value. In view of this variation, the claimed amount of 0.004 can be met and applicant has not shown evidence to the contrary (of what about means).

With respect to claim 32 (now claim 40), applicant argues that since Pasqualoni uses additional components (oxidizer), it is outside the scope of the instant claims (consisting essentially of). The examiner disagrees because applicant has not clearly shown that the use of an oxidizer will materially change the characteristics of applicant's invention (no characteristics

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are claimed in claim 40). Applicant has the burden of showing that the introduction of additional would materially change the characteristics of applicant's invention and no clear evidence (comparative testing) has been defined.

**Arguments based on Fang/Moeggenborg.**

With respect claim 19, applicant argues that Fang is not directed towards polishing dielectrics. The examiner disagrees because Fang teaches polishing silicon dioxide at a relatively high rate (dielectric layer-see column 6, lines 55-56). Applicant also argues that Fang discloses a composition without any bounds. Although numerous compositions might be possible in the reference, this does not detract from the teachings of a composition that comprises an abrasive (colloidal silica), a fluoride salt and a surfactant because these components are specifically named in the reference as being part of the composition. Applicants state that they would be pressed to name any chemical or compound which would not be included in the composition of Fang. This is not persuasive because at least the following genus/species, phosphites, sulfites, nitrites, ethers, aromatic compounds, nitriles to name a few, are not disclosed by Fang, contrary to applicants assertion. Furthermore, just because applicant cannot fathom additional species does not add patentability to the claimed subject matter and is not a proper response when the claimed materials are defined (i.e. use of claimed surfactant would have been of obvious (see above) and applicant has not clearly argued this). In view of this, the combined references clearly teach the claimed composition and the surfactant amount is obvious as set forth in the above rejection and further remarked on below.

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Applicant also makes a statement that they would be hard pressed to name any electronic substrate not included in Fang. Just because applicant cannot fathom additional substrates does not add patentability to the claimed subject matter and is not a proper response when the claimed substrate (i.e. silicon dioxide (dielectric)) is clearly defined.

Applicant argues that Fang does not disclose a composition containing silica which might polish a dielectric at a high rate. This is not persuasive because the reference clearly teaches colloidal silica is used in the composition and that the composition polishes silicon dioxide at a relatively high rate. Applicant argues that Fang does not teach the claimed surfactant nor the concentration range. The examiner acknowledges this and has applied a secondary reference to clearly show that this is obvious (applicant has not clearly responded to examiners position of prima facie obvious). Applicant also argues that one of ordinary skill in the art given the disclosure of Fang could run numerous combinations of Fang with the various surfactants in the industry before possibly happening in the combination as claimed. They argue this aspect with respect to hindsight reasoning. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). Even though numerous combinations can be made does not detract from the combination rejection if the claimed combination is obvious. Since the examiner established clear reasons why the combination is

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proper and applicants have not clearly and persuasively argued against this, applicants' arguments are not convincing. In addition, no evidence of criticality is provided for the claimed composition commensurate in scope.

Applicant appears to argue that Moeggenborg, in comparative example 4, teaches that the claimed diol had little effect and silica removal rates and a large negative effect on carbon doped oxide removal rates. The examiner acknowledges the results in this table, however, the examiner is unclear as to this line of argument because (1) Fang does mention carbon doped oxide, thus establishment of criticality for the use of the claimed diol for removing silicon dioxide when compared to carbon doped oxide does not show criticality for using the claimed surfactant and (2) in the comparative examples of Moeggenborg, no fluoride was present so how can the same results be expected since the fluoride also functions to achieve the polishing rate sought.

With respect to the amount of surfactant, applicant argues that an amphiphilic nonionic surfactant is not believed to encompass the claimed acetylenic diol. The examiner disagrees because in section [0019] Moeggenborg states that amphiphilic nonionic surfactants include acetylenic diol based surfactants. Assuming further arguendo, the skilled artisans would have appreciated the amount needed to optimize the slurry in terms of the wettability, said amounts being conventional in the art, as shown by the Moeggenborg. The amount of surfactant defined by Moeggenborg is a conventional amount of surfactant known to be added in polishing compositions. If applicant would like, the examiner can point to numerous other references that disclosed that the claimed amount is conventional in the art of polishing compositions. Applicant argues that the range of claim 19 does not optimize wettability but rather optimizes the property of providing low defectivity. The purpose of the surfactant is immaterial and applicant



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have not clearly shown evidence rebutting the examiners contention about the surfactant amount (evidence clearly establishing why this amount is not obvious)

Applicant argues that Fang does not provide any evidence of what is meant by “relatively high rate”. Although this may be true, to paraphrase applicant “one of ordinary skill in the art would know and understand the scope of the phrase “high rate” as it applied to oxide polishing” (this is what Fang polishes). If applicant is implying that the skilled artisan would not know what is considered “high rate”, this would also establish evidence that the claimed limitation of “high rate” is indefinite because the metes and bounds are not clearly defined. However, since applicant clearly argues that “high rate”, as claimed, would be understood by the skilled artisan, then “high rate”, as defined by the reference would also be understood by the skilled artisan. In other words, if the skilled artisan would have understood what is mean by high rate in the instant claims, why would they not understand what is meant by high rate in Fang? Applicant also argues the examples of Fang and that the polishing rates of the examples must be the high rates mentioned in Fang. This is not persuasive because (1) a reference is not only limited to the disclosure in the examples, (2) applicant shows no clear evidence that “high rate” can only mean the rates defined in the examples and (3) as defined above, and admitted by applicant, the skilled artisan would understand what is meant by high rate.

Finally, applicant states that they believe the examiners rejection is based on the clearest case of hindsight. The examiner disagrees because it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. Since the rejection takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the

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applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

With respect to claims 21 and 34, applicant argues the “high rate” of Fang. These arguments have been clearly addressed above. Applicant also appears to argue that the composition of the combined references will not provide an oxide composition capable of polishing at high rates. This conclusion is based on (1) no teaching or suggestion of what is considered “high rate” in Fang and (2) the examples of Moeggenborg teach medium removal rates. In response to these arguments, the examiner incorporates by reference the remarks defined in the argument section of Misra/Moeggenborg.

With respect to claim 22, applicant states that it is maintained that the disclosure of Fang does not teach one of ordinary skill in the art to employ the claimed amount of fluoride. The examiner disagrees because the examiner clearly established reasons why the claimed amount is obvious (applicant does not clearly argued this) and Fang literally defined the claimed material irrespective of the numerous other compounds named.

With respect to claims 30 and 39, applicant argues that since Fang uses fumed silica, it is outside the scope of it is outside the scope of the instant claims (consisting essentially of). Applicant is reminded that only claim 39 only uses “consisting essentially of”. The examiner disagrees because applicant has not clearly shown that the use of fumed silica will materially change the characteristics of applicant's invention. Applicant has the burden of showing that the introduction of additional would materially change the characteristics of applicant's invention and no clear evidence (comparative testing) has been defined. Although fumed silica might be essential in the reference, this does not positively establish that fumed silica will materially

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change the characteristics of applicant's invention. In addition, it should be noted that claim 19 defines a composition "comprising" and since comprising is used this opens the composition to additional components (i.e. a second inorganic material which is fumed silica, irrespective of what the material is called).

With respect to claim 32 (now claim 40), applicant argues that since Fang et al. uses additional components (fumed silica), it is outside the scope of the instant claims (consisting essentially of). The examiner disagrees because applicant has not clearly shown that the use of an oxidizer will materially change the characteristics of applicant's invention (no characteristics are claimed in claim 40). Applicant has the burden of showing that the introduction of additional would materially change the characteristics of applicant's invention and no clear evidence (comparative testing) has been defined. Although fumed silica might be essential in the reference, this does not positively establish that fumed silica will materially change the characteristics of applicant's invention. Applicant also argues that Fang does not teach a composition containing water, silica, fluoride and the particular surfactant defined in claim 40. The examiner acknowledges this and that is why the examiner made a combination rejection. It would appear that this line of argument is directed to Fang alone and not in the combination as applied. Applicant also appears to argue argues that Fang discloses a composition without any bounds. This is addressed above. Applicant also argues that one of ordinary skill in the art given the disclosure of Fang could run numerous combinations of Fang with the various surfactants in the industry before possibly happening in the combination as claimed. They argue this aspect with respect to hindsight reasoning. The examiner has fully addressed this line of argument above. The examiner is not cherry picking because Fang *literally* discloses all of the claimed

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components except the claimed surfactant which is obvious and applicant has not clearly argued against this. A reference that *literally* names the claimed species renders the claim obvious no matter how many other species are named absent evidence of criticality for the claimed species..

With respect to new claims 36, 38, 46 and 47, applicant argues that the references do not define these features. The examiner acknowledges this, however, these features are either (1) not defined by a positive method step of the polishing method (i.e. claim 36 states “when supplied”, as this is not a positive method step and claims 38, 46 and 47 do not state that after polishing, the wafer is washed with HF and (2) even if they are positive polishing method step, these parameters are considered result effective variables, therefore one skilled in the art would be expected to be able to optimize these parameters.

Specifically, with respect to claim 36 although the combination above does not literally define the washing with HF and resulting defect count, no distinction is seen to exist because (1) the claims do not define that this is a positive method step of the polishing method (i.e. the claims state “when supplied” and this is not a positive method step) and (2) even if it is a positive polishing method step, these parameters are considered result effective variables, therefore one skilled in the art would be expected to be able to optimize these parameters to arrive at the desired polishing rate. See MPEP 2144.05[R-5]-Optimization Within Prior Art Conditions or Through Routine Experimentation. The passage is defined below.

Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges

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by routine experimentation.” In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) (Claimed process which was performed at a temperature between 40°C and 80°C and an acid concentration between 25% and 70% was held to be prima facie obvious over a reference process which differed from the claims only in that the reference process was performed at a temperature of 100°C and an acid concentration of 10%.); see also Peterson, 315 F.3d at 1330, 65 USPQ2d at 1382 (“The normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages.”); In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969) (Claimed elastomeric polyurethanes which fell within the broad scope of the references were held to be unpatentable thereover because, among other reasons, there was no evidence of the criticality of the claimed ranges of molecular weight or molar proportions.). For more recent cases applying this principle, see Merck & Co. Inc. v. Biocraft Laboratories Inc., 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989); In re Kulling, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990); and In re Geisler, 116 F.3d 1465, 43 USPQ2d 1362 (Fed. Cir. 1997).

With this being obvious, it is the examiners position that the results obtained can be the claimed wafer defect count and burden is upon applicant to show otherwise.

Specifically, with respect to claim 38, 46 and 47, although the combination above does not literally define the washing with HF and resulting defect count, no distinction is seen to exist because (1) the claims do not define that this is a positive method step of the polishing method (i.e. the claims do not state that after polishing, the wafer is washed with HF), (2) the use of a

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washing step defines a post polishing method and cannot be considered to be a polishing method, per se and (3) even if it is a positive polishing method step, the examiner takes official notice that washing a wafer with a 1% HF solution is conventional in the art (see Feeney at column 4, lines 41-43 in the art rejection above), thus the use of a washing step to remove residuals from the wafer is well within the scope of the skilled artisan and therefore obvious. With this being obvious, it is the examiners position that the results obtained can be the claimed wafer defect count and burden is upon applicant to show otherwise.

In summary, applicant has not shown any critical evidence for the claimed composition nor established clear evidence that the reference compositions, as combined, cannot polish at the claimed high rate.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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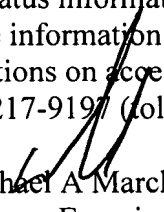
however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael A. Marcheschi whose telephone number is (571) 272-1374. The examiner can normally be reached on M-F (8:00-5:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on (571) 272-1233. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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MM

  
Michael A Marcheschi  
Primary Examiner  
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